



Rocket-Propelled Toy Car

Written By: Tom Fox



PARTS:

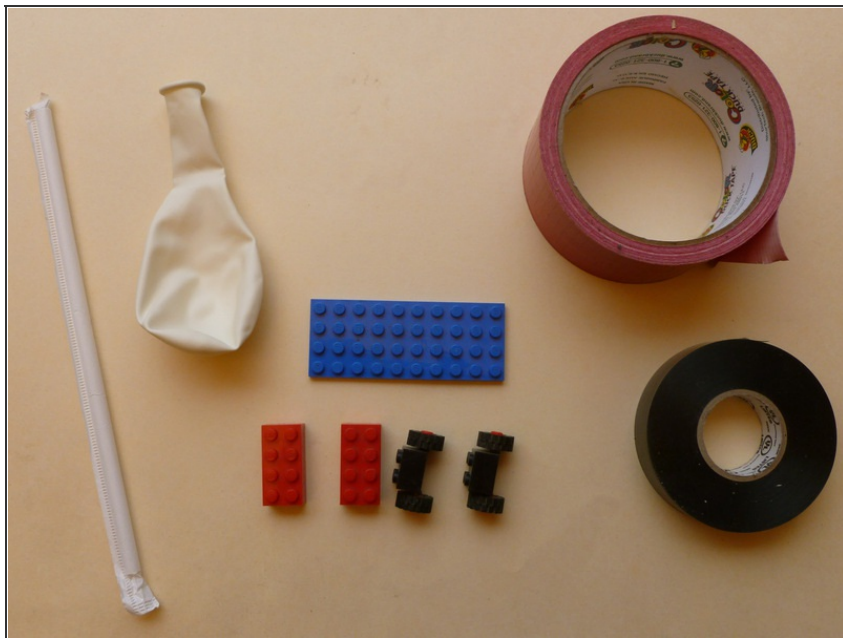
- [soda straw \(1\)](#)
- [Balloons \(1\)](#)
- [Lego parts to make small toy car \(1\)](#)
[see photos](#)
- [Duct tape \(1\)](#)
- [Electrical Tape \(1\)](#)

SUMMARY

This toy car, made with LEGOS and powered by a blown-up balloon, is super simple and fun to make and fun to play with. It is also educational since it uses the principle of rocket propulsion. In addition to showing how to make the rocket-propelled toy car, this guide also includes a short and easy-to-understand explanation how rocket propulsion works. This explanation of rocket propulsion is intuitive and uses the very basic scientific principle of unbalanced forces acting on an object. The video

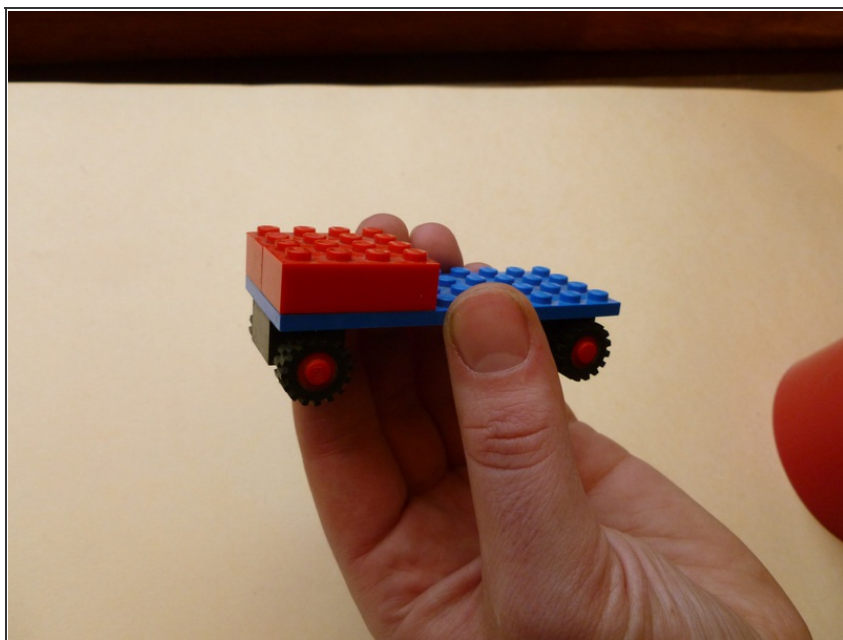
gives more details on the theory behind rocket propulsion. I have used this explanation in several of my Workshop Articles in *Boys' Quest* and *Fun For Kidz* magazines as well as in my book *Snowball Launchers, Giant-Pumpkin Growers and Other Cool Contraptions* which are all aimed at children. I have received numerous positive comments on this explanation.

Step 1 — Rocket-Propelled Toy Car



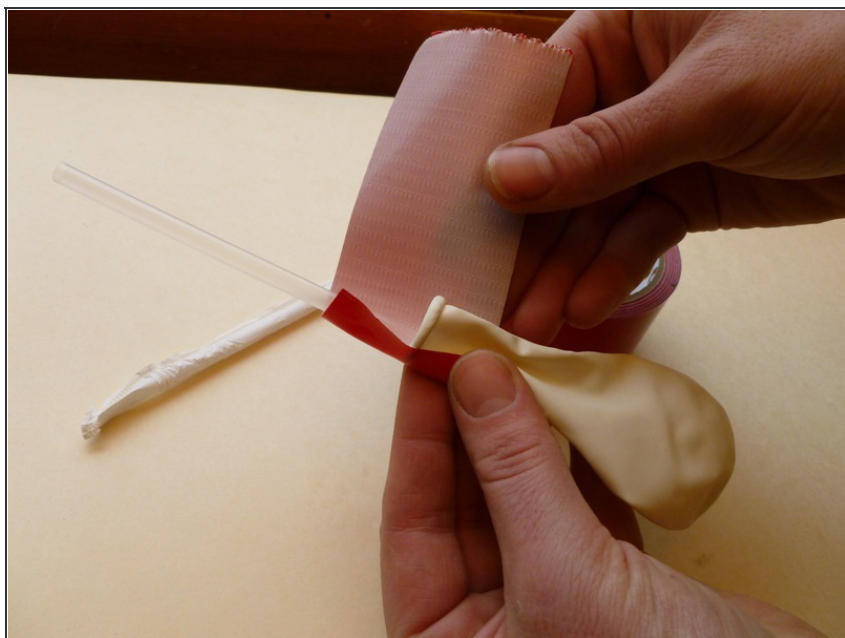
- This is the stuff you will need to make the rocket propelled toy car.
- Hint: Use only a good quality soda straw.
- Hint: Use a good quality balloon. Also, it is wise to limber up the balloon by blowing it up a few times before using it in this project. This will make it easier to blow up using the straw.
- The smallest Lego wheels work best.
- Any duct tape will work. I used red because it is more colorful.

Step 2



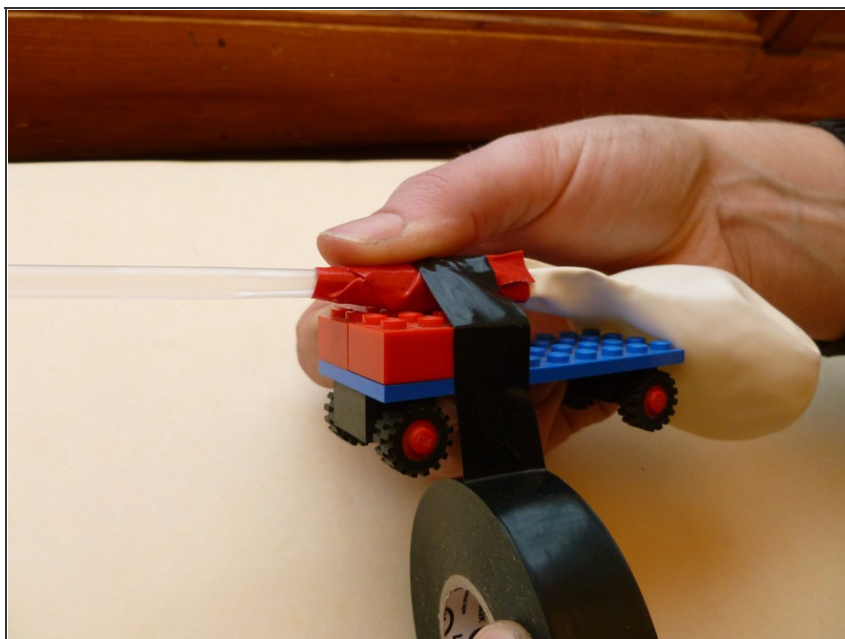
- The photo is self-explanatory
- Notice the small size of the Lego wheels used here.

Step 3



- Insert the straw as far into the balloon as it will go.
- Make sure you make a nearly perfect seal with the duct tape so air doesn't leak out between the straw and balloon.

Step 4



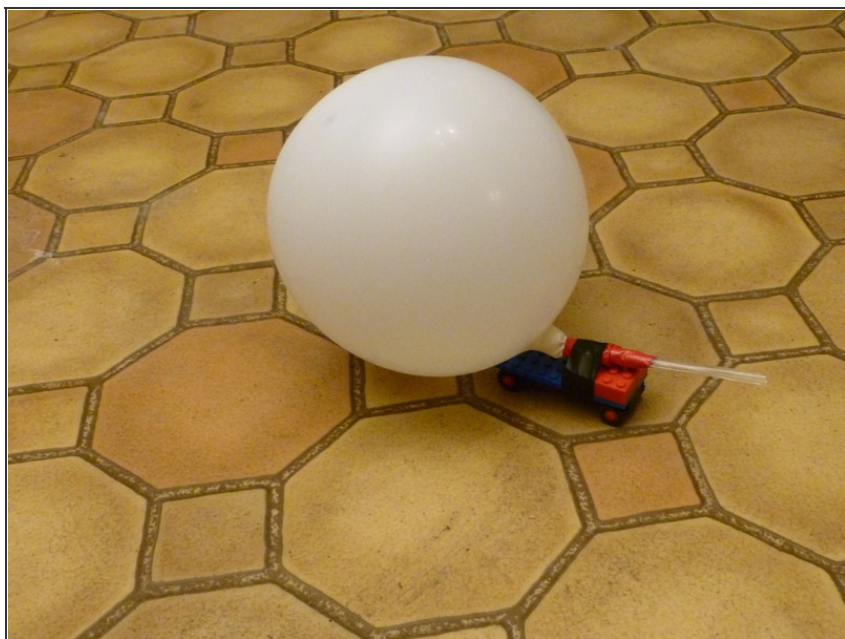
- Use electrical tape to attach the straw-balloon combination to the Lego car you just made.

Step 5

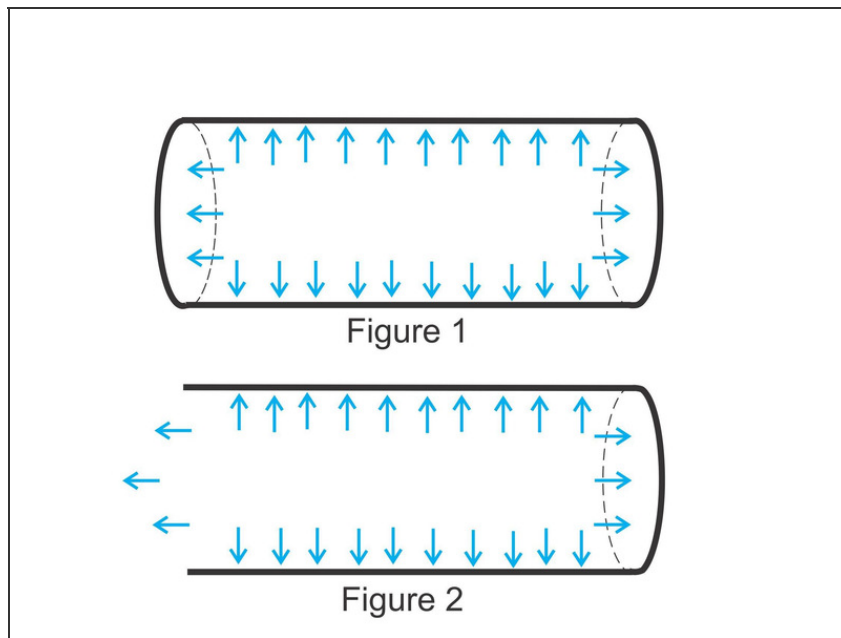


- After blowing up the balloon make sure you squeeze the straw enough to keep the air in the balloon.

Step 6



- When you want to start the car moving, simply let go of the straw!

Step 7

- The blue arrows represent forces produced by the gas pressure pushing on the sides of a sealed cylinder.
- In Figure 1 forces are equal in all directions (balanced forces), so no movement of the cylinder occurs.
- In Figure 2 the left side of the cylinder was suddenly removed. Now the pressurized gas in the cylinder can push only to the right because there is no longer a left side to push against.
- Unless the cylinder is fastened securely to an immovable object (or very heavy object) the cylinder would move to the right. The forces are now unbalanced.
- While the law of conservation of momentum is invaluable when making practical calculations when designing rocket engines, one must keep in mind that momentum is the effect here and that unbalanced forces are the cause of a rocket zooming off into space!

Once you get your rocket-propelled toy car working, why not experiment a bit? How about trying two straws? Why not make a larger Lego car and use a larger balloon? Use your imagination. Some people think that the reason the car moves forward is because of the air coming out of the straw. Try this experiment, either as an actual experiment or as a thought experiment. Use a

large balloon and a 6 foot long piece of 1/4" plastic hose instead of a straw. After blowing up the balloon pinch the hose right where the hose and balloon join. Put the car down on the floor and let go of the hose. Will the car start moving the instant you let go of the hose or will it sit there until the air comes out of the balloon? What do you think? If you try it out please keep in mind that there is such a thing as inertia...

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